HEATING PANEL AND METHOD THEREFOR

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 13/508,024, filed on May 18, 2012, which is a US National Stage application under 35 USC 371 of PCT International Application No. PCT/IB2010/055016, filed on Nov. 5, 2010, which claims priority to, and the benefit of U.S. Provisional Patent Application No. 61/272,804, filed on Nov. 5, 2009, all of which are herein incorporated by reference in their entirety for all purposes.

TECHNICAL FIELD

The present invention relates to a heating panel and methods of production and installation therefore. More particularly but not exclusively it relates to a wallboard heater and method therefore.

BACKGROUND

Wallboards are typically used to provide an interior finish for building constructions. They may consist of gypsum panels coated on each side by a paper sheet. The introduction of a heating element into a wallboard for use as a radiant and convection heater is known, as disclosed in U.S. Pat. No. 3,598,960. Typically such wallboard heating operates mainly on the principle of radiant heating, with a small amount of convection heating resulting from the heated wallboard.

This heating offers many advantages, in that when the heating panel is used to cover a wall or preferably a ceiling, the heating effect it generates allows for an even distribution of heat, with a relatively large part of the room being exposed to the radiant heating effect, as compared to other radiant heating mechanisms.

Such a heating process is also an efficient heating process that can heat a large room up relatively quickly compared to convection heating.

One type of wallboard heating panel is made in a moulding process. This typically includes receiving gypsum slurry into a mould together with fibres to impart flexibility (since paper cannot be moulded to either side of the gypsum panel), as well as heating elements such as a metallic conductor. Such an example is shown in WO 2009/0055959.

However, the manufacture of such moulded heating panels is an expensive manual production process, and is difficult and hence expensive to automate. Further, such batch-type production processes may not allow for high production rates.

In another form, heating panels that operate on electrical resistivity or hot water conduction are mounted in the ceiling behind normal wallboards. Such heating panels are either hot water pipes, or plastic sheets having electrically resistive circuits embedded in them. A faulty connection of a heated water pipe system can result in parts of a ceiling or wall being ruined.

However, such heating panels is labour intensive as two sets of panels need to be installed in or on the ceiling.

Localised heating behind the wallboard means that high temperatures could cause the gypsum (which started as calcium sulphate hemihydrate, before it is hydrated and sets as calcium sulphate dihydrate after excess water is dried off) to lose its integrity and degenerate back to its hemihydrate form.

Typically the surface temperature of the plasterboard inside the room is required to be around 38° C., although the board can reach localised temperatures in the order of 50° C.

Heating panels installed behind ceiling cladding may also result in a longer heating up period, and may cause problems due to the high heat above the ceiling wallboards. One example of this is that structural timber may dry out and/or shrink, causing warping and/or movement of the installed ceiling.

The termination of electrically heated panels with embedded circuits or circuits disposed immediately behind the installed ceiling or wall panels can also be problematic, since any short circuit break in the circuit would be difficult to establish and locate. Also, such systems usually have established termination points at particular predetermined locations relative to the wall board, and may be difficult to connect up where they are not easily accessible.

In this specification, where reference is made to a series of steps in a method or process, the steps are not intended to be in chronological order except where they are specifically introduced as such.

For the purposes of this specification, the term "heating element" is defined to mean any conductive or semi-conductive member or layer that undergoes a heating effect when an electrical current is passed through it.

For the purposes of this specification, the term "plastic" shall be construed to mean a term for materials generally regarded as being a "plastic" material and shall include, but not be limited to a wide range of synthetic or semi-synthetic polymerization products, and including hydrocarbon and non-hydrocarbon-based polymers.

In this specification, where reference has been made to external sources of information, including patent specifications and other documents, this is generally for the purpose of providing a context for discussing the features of the present invention. Unless stated otherwise, reference to such sources of information is not to be construed, in any jurisdiction, as an admission that such sources of information are prior art or form part of the common general knowledge in the art.

It is an object of the present disclosure to provide a heating panel and method therefor, which overcomes or at least ameliorates some of the abovementioned disadvantages or which at least provides the public with a useful choice.

SUMMARY

In a first aspect the present disclosure broadly comprises a method of manufacture of a rigid heating panel comprising the steps of

- providing a continuous feed of a first sheet of material;
- continuously depositing a layer of settable gypsum slurry onto the first sheet of material in a continuous process to form a continuous open wallboard feed;
- continuously depositing at least one heating layer substantially along the length of the continuous open wallboard feed to at least partially embed in said settable gypsum slurry, said heating layer comprising:
  - a heating element configured as a mesh, and
  - a pair of electrical conductor members, said electrical conductor members being relatively more conductive than the heating element, and arranged to extend